

MICROCOMBUSTOR AND COMBUSTION-BASED THERMOELECTRIC MICROGENERATOR

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5 ABSTRACT OF THE DISCLOSURE

A generally toroidal counterflow heat exchanger is the main element of a combustor that operates at a micro scale. The combustor includes a central combustion region with openings to a reactant gas channel and an exhaust gas channel. The reactant channel and exhaust channels are coiled around each other in a spiral configuration that 10 reduces heat loss. An electric current microgenerator is similar and also includes a thermoelectric active wall composed of n-type and p-type thermoelectric elements as part of a channel wall of the microcombustor. The thermoelectric active wall includes fins configured to increase the temperature differential across the thermoelectric elements relative to the temperature difference between the thermoelectric elements and the 15 reactant and exhaust gases. A method of monolithically fabricating such microdevices by electrodepositing multiple layers of material is also provided.